

DISCUSS HOW ATMOSPHERIC AND LIGHTING CONDITIONS EFFECT SCANNING EFFECTIVENESS

CONDITIONS

You are a Mission Scanner trainee and must discuss how atmospheric and lighting conditions effect scanning effectiveness.

OBJECTIVES

Discuss how atmospheric and lighting conditions effect scanning effectiveness.

TRAINING AND EVALUATION

Training Outline

1. As a Mission Scanner trainee, knowing how atmospheric and lighting conditions effect scanning is essential. During daylight there are many factors that can affect the scanner's ability to spot the search target. The following table shows the (approximate) distance at which the scanner can sight various objects under average visibility conditions; factors that can alter these distances are discussed below.

Object	Distance
Person in life jacket (open water or moderate seas)	1/2 mile
Person in small life raft (open water or moderate seas)	3/4 mile
Person in open meadow within wooded area	1/2 mile or less
Crash in wooded area	1/2 mile
Crash on desert or open plain	2 miles
Person on desert or open plain	1 mile or less
Vehicle in open area	2 miles or less

During darkness, scanners make fewer fixations in their search patterns than during daylight because victims in distress are likely to use lights, fires, or flares to signal rescuers. Contrast between signal light and surrounding darkness eliminates the need for scanners to concentrate on making numerous eye fixations. An attentive scanner or observer should be able to see a light, flare, or fire easily during night operations. Search aircraft interior lighting should be kept to the lowest possible level that still allows normal chart reading. This will help the eyes adjust to the darkness and reduce glare on windshield and window surfaces. Red lights are used when flying at night because that color has little or no affect on the low-light adaptation of the human eye.

Regardless of light conditions, a scanner should always maintain a systematic scanning pattern with fixations every few seconds. Darkness merely lengthens the interval between fixations.

2. Atmospheric conditions. All aircrews hope for perfect visibility during a SAR mission, but this atmospheric condition rarely exists. Most of the time the atmosphere (especially the lower atmosphere) contains significant amounts of water vapor, dust, pollen, and other particles. These items block vision according to their density. Of course, the farther we try to see the more particles there are and the more difficult it is to sight the objective.
3. Position of the sun. Flying "into the sun," soon after it rises in the morning or before it sets in the afternoon, poses visibility problems. No doubt you have had this experience while driving or riding as a crewmember in an automobile. Recall how difficult it is to distinguish colors and to detect smaller objects.
4. Clouds and shadows. Shadows produced by clouds can reduce the effective scanning range. This is due to the high contrast between sunlit area and shadows. Our eyes have difficulty adjusting to such contrasts. The same effect occurs in mountainous areas where bright sunlight causes the hills and mountains to cast dark

shadows. Heavy cloud cover can "wash out" colors on the ground, making wreckage and colored clothes or signal devices harder to sight.

5. Terrain and ground cover. The more intensive search efforts occur over terrain that is either mountainous or covered with dense vegetation, or both. Mountainous area searches demand frequent variation in the scanning range. This you can visualize fairly easily; at one moment the mountain or hill places the surface within, say 200 feet of the aircraft. Upon flying past the mountain or hill the surface suddenly may be a half-mile away. Forested areas can reduce the effective scanning range dramatically. This is especially true during spring, summer, and fall when foliage is most pronounced. The situation doesn't change for the better in the winter where trees are of the evergreen types-pine, spruce, etc.-because the height of the trees plus their foliage masks the search objective very effectively. Frequently the only way for a scanner to actually spot an objective under such circumstance is to be looking down almost vertically. There are other signs to look for in such areas, but we will discuss them later.

6. Surface conditions. Here we are thinking of snow, primarily. Even a thin covering of new snow will change the contour, or shape, of a search objective. Also, the light-reflective quality of snow affects visual effectiveness. The net result is a need to bring the scanning range nearer to the aircraft.

7. Cleanliness of windows. This might seem to be a very minor factor. On the other hand, it is estimated that the scanner's visibility can be reduced up to 50 percent if the aircraft window isn't clean. If you discover this to be the case in your aircraft, clean the window yourself. However, aircraft windows are made of plastic and they are easily scratched. Ask the pilot what cleaning materials and methods are acceptable before cleaning the window. Window cleaning is a normal part of pre- and post-flight activities.

8. Use of binoculars, cameras, and sunglasses. Binoculars rapidly bring on eye fatigue when used in an aircraft, and may lead to disorientation and airsickness. They should only be used for *brief* periods to check sightings or for detailed viewing of an assessment area or target. Looking through a camera or camcorder viewfinder for extended periods can be equally as discomforting. Take breaks whenever possible. Sunglasses are an important tool for aircrew, reducing eye fatigue and glare: however, sunglasses do have some negative aspects. Looking through the aircraft windshield with polarized lenses can result in a reduced retinal image. Also, color discrimination is reduced while wearing dark lenses. And, of course, if you are looking for a lost person wearing a blue jacket, don't wear sunglasses with "blue-blocking" lenses. Finally, no matter how cool it may look, don't wear sunglasses while flying in low visibility conditions (i.e., overcast and at dawn, dusk or night).

Additional Information

More detailed information on this topic is available in Chapter 5 of the MART.

Evaluation Preparation

Setup: None.

Brief Student: You are a Scanner trainee asked about how atmospheric and lighting conditions effect scanning.

Evaluation

Performance measures

Results

1. Discuss how atmospheric and lighting conditions effect scanning effectiveness.

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Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.